

AMENDMENTS TO THE CLAIMS

Please replace the claims, including all prior versions, with the listing of claims below.

Listing of Claims:

1. (Currently amended) A method for producing a deep trench capacitor in a semiconductor substrate, comprising:
 - providing a first trench in the semiconductor substrate;
 - oxidizing the semiconductor substrate in the first trench for providing an oxidized silicon layer;
 - depositing a very thin conformal ~~aluminium-oxide~~ aluminum-oxide layer in the first trench for shielding the side walls of the first trench, wherein the very thin conformal aluminum-oxide layer provides a process window which is as wide as possible for processing a second trench underneath the first trench;
 - removing horizontal regions of the deposited aluminium-oxide layer and the oxidized silicon layer;
 - providing a second trench underneath the first trench;
 - increasing a width of the second trench to a widened second trench for providing a bottle structure;
 - removing the aluminum-oxide layer in the first trench;
 - depositing a dielectric layer in the widened second trench; and
 - filling the widened second trench with a conductive filling.
2. (Previously presented) The method according to claim 1, wherein after increasing the width of the second trench to the widened second trench a doping the semiconductor substrate in the widened second trench is provided for providing a first electrode.
3. (Previously presented) The method according to claim 1, wherein after increasing the width of the second trench to the widened second trench or after doping the semiconductor substrate in the

widened second trench, further comprising: depositing a rugged polysilicon layer in the widened second trench.

4. (Previously presented) The method according to claim 3, wherein the depositing of the rugged polysilicon layer in the widened second trench is provided by a hemispherical grain polysilicon deposition process.

5. (Previously presented) The method according to claim 1, wherein depositing a dielectric layer comprises:

depositing a first silicon nitride layer; and
oxidation the first silicon nitride layer for providing the dielectric layer.

6. (Previously presented) The method according to claim 1, wherein the conductive filling is a polysilicon filling.

7. (Previously presented) The method according to claim 1, wherein the aluminium-oxide layer is a Al_2O_3 -layer.

8. (Previously presented) The method according to claim 1, wherein increasing the width of the second trench to the widened second trench for providing the bottle structure is provided by a wet etching process.

9. (Previously presented) The method according to claim 1, wherein the increasing the width of the second trench to the widened second trench for providing the bottle structure is provided by a reactive ion etching process.